

Field screening of broad bean (*Vicia faba* L.) cultivars of Manipur for their resistance reaction to *Aphis craccivora* (Koch.)

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Broad bean, *Vicia faba* L. is one of the important pulse crops in India. Broad bean is a native of Mediterranean region or South Western Asia (Perseglove, 1974). The crop is grown mostly in the North Eastern regions and often consumed as vegetable. The nutritional value of the bean is considerable and its composition is very similar in many ways to that of meat. Indeed, they are often called Poor man's meat (Ali *et al.*, 1981). In Egypt, the young seeds are boiled with tomatoes and spices as a vegetable (Gabrial, 1981).

Broad bean is grown widely in the hilly terrains of Manipur. However, productivity of this crop is far below the national average and of its potential. Amongst the several abiotic and biotic factors for low productivity of broad bean, the damage caused by insect-pests which attack the crop from seedling to pod maturity stage is considered as one of the major production constraints. Among the different insect-pests of broad bean observed in Manipur, black aphid (*Aphis craccivora*) causes serious damage to the crop. It is, therefore, considered imperative to initiate investigation on this aphid of broad bean, one of the most important pulse crops of the state. On the other hand, very few research work has been conducted on black aphid resistant/tolerant broad bean varieties in the North Eastern Region of India. Given this backdrop, the present investigation was undertaken for screening of local broad bean (*Vicia faba* L.) cultivars of Manipur for their resistance reaction to *Aphis craccivora* (Koch.).

The present investigation was carried out under the agro-climatic condition of Manipur. The experimental field is located at 24°45'N latitude and 93°56'E longitude at an elevation of 790 m above MSL. The soil of the experimental field was clay loam in texture and acidic in reaction (pH 5.5). The experiment was laid out in Randomized Block Design (RBD) with four replications. Five local cultivars of broad bean viz., broad bean local collection-1 (BLC-1), broad bean local collection-2 (BLC-2), broad bean local collection-3 (BLC-3), broad bean local collection-4 (BLC-4) and broad bean local collection-5 (BLC-5) were used for screening their reaction against *Aphis craccivora* Koch. All the cultivars are grown widely by the farmers and very popular among the local people of Manipur. Standard agronomic practices were followed for managing the crop. The experimental plots (2 m x 3 m) were fertilized with FYM @ 5 t ha⁻¹ and N: P₂O₅: K₂O @ 20:60:40 kg ha⁻¹. The source of N, P₂O₅ and K₂O were Urea, Single Super Phosphate and Muriate of Potash, respectively. The crop was planted with a spacing of 30 cm

x 20 cm and kept devoid of insecticide application throughout the experimentation.

The reaction of different cultivars of broad bean to aphid was assessed through recording aphid population per plant at flowering and pod formation stages of the crop. Ten plants were selected randomly from each cultivar in a replication. The aphid population was recorded in each cultivar and given an appropriate grade on their reaction against the pest using the following grades described by Teotia and Lal (1970).

Grade	No. of Aphids per Plant	Designation/Remarks
0	0	No aphid
1	20	Insignificant
2	> 20-100	Very low
3	>101-200	Low
4	>201-350	Medium
5	>351-500	High
6	>501	Very high

During the course of investigation, the range of maximum and minimum atmospheric temperature was 18.2 to 28.2°C and 2.3 to 16.5°C minimum, respectively; whereas relative humidity varied from 58.0 to 98.0 per cent which indicated the ideal favorable condition for *Aphis craccivora*. Moderate incidence of the aphid (mean population of 10.00 to 124.94 aphids plant⁻¹) was observed in the broad bean cultivars during the period of investigation. The results observed during the investigation showed wide variation among the different cultivars for their resistance reaction to the black aphid, *Aphis craccivora*. The perusal of the data (pooled over two years) on screening of five broad bean cultivars for their resistance reaction to *Aphis craccivora*, exhibited that none of the cultivars was found to be immune or highly susceptible to the aphid infestation though considerable variability existed in their resistance reaction to the pest (Table 1 and 2). The mean population in the screened cultivars varied from 10.00 (BLC-1) to 124.94 (BLC-3) aphids per plant. The aphid population recorded in BLC-4 (123.44 aphids plant⁻¹) against *A. craccivora* was at par with that of BLC-3 (124.94 aphids/plant). However, two cultivars viz., BLC-1 and BLC-2 were least infested and classified as insignificant reacting cultivars with a record of 10.00 and 16.19 mean aphid population per plant, respectively. One cultivar, BLC-5 has shown very low resistance (> 20-100 aphid population/plant); whereas, low susceptible reaction was recorded with BLC-4 and BLC-3 (> 101-200 aphids plant⁻¹).

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Table 1: Reaction of broad bean cultivars against *Aphis craccivora* Koch.

Cultivar	Mean aphid population at different stage		
	At flowering stage	At pod formation stage	Pooled Mean
BLC-1	17.25 (4.18)	2.75 (1.88)	10.0 (2.88)
BLC-2	16.00 (4.04)	16.38 (4.08)	16.19 (4.06)
BLC-4	133.13 (11.52)	113.75 (10.69)	123.44 (11.10)
BLC-5	75.13 (8.70)	45.75 (6.80)	60.44 (7.75)
BLC-3	129.75 (11.41)	120.13 (10.98)	124.94 (11.19)
SEd (±)	0.45	0.34	0.44
LSD (0.05)	1.03	0.77	1.00

Table 2: Rating on reaction of broad bean cultivars against *Aphis craccivora* Koch.

Cultivars	Mean aphids population plant ⁻¹	Grade	Designation /Remarks
BLC-1	10.00	1	Insignificant
BLC-2	16.19	1	Insignificant
BLC-4	123.44	3	Low
BLC-5	60.44	2	Very low
BLC-3	124.94	3	Low

In the present findings, the cultivars under the trial have not been tested earlier. Therefore, the results obtained here on this aspect could not be substantiated with the findings of earlier workers. However, various workers like Youis *et al.* (1985); Mohammad and Mohmoud (1988); El-Defrawi *et al.* (1991); Kuang and Xiao (1997); Mustafa and Samara (1999) and Mohamed and Slman (2001) investigated the several field screening trials using different other cultivars/varieties of broad bean for their resistance reaction against *Aphis craccivora* and reported a variation of aphid incidence among the screened cultivars/varieties. They also suggested that high susceptible/heavy infestation of the broad bean varieties possibly due to its higher nitrogen and protein content in plant leaves and stem. Saleh *et al.* (1972) and Blaeser (1982) also observed a moderate infestation of broad bean crop due to *Aphis craccivora* under South Egypt condition.

The significant results generated from the study clearly revealed that *Aphis craccivora* was a regular pest of broad bean and maintained moderate level of population under valley condition of Manipur. Among the five cultivars tested in the present experiment, BLC-1 and BLC-2 were found to be suitable in terms of their resistance against black aphid. The cultivars may be recommended for the regions where aphid is a predominant pests for broad bean or can be included in future breeding programme to evolve better varieties.

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